REMARKS

Applicant wishes to thank the Examiner for the courtesy of a telephone interview. The *Lee et al.* (PCT Publication No. WO 96/32520) was discussed per the comments set forth herein and it is believed that Claims 36 and 37 provided sufficient structure to distinguish over *Lee et al.* No agreement was reached on allowability and Examiner Kunemund reserved the right to further review the formal response.

In accordance with Rule 126, applicants have renumbered the previous added claims as Claims 36 and 37.

Claims 28 and 29 have been cancelled without prejudice to limit the issues in accordance with 37 CFR § 1.116.

Attached hereto is a Supplemental Declaration to affirm that the error was having only method claims considered in U.S. Patent No. 5,993,543, and not having claims directed to the apparatus and to the system examined, although they were disclosed in the specification and drawings. It is believed that the issue with regards to the Reissue Application Declaration has now been adequately addressed by this submission.

The Office Action contended that the outstanding Claims 36 and 37 would be obvious over the *Lee et al.* (PCT Publication WO 96/32520).

The Office Action contended that our arguments in the Amendment filed on October 4, 2004 were not persuasive because the arguments were directed to the *Lee et al.* (U.S. Patent No. 5,849,370) and that the teachings in the '370 patent were not the same as set forth in the *Lee et al.* PCT reference. Applicants respectfully traverse this position since it can be seen from WO 96/32520 that the priority data is based on the U.S. Serial No. 08/423,645 filed on April 14,

1995, which is the parent application from which a continuation application issued as U.S. Patent No. 5,849,370.

Additionally, the comments in the Amendment related directly to the same disclosure since the PCT/WO Publication teaches on Page 8, Lines 11-13, that a magnesium oxide layer is not disclosed, but rather only a magnesium fluoride coating. Additionally, the substrate is heated to approximately 200°C on Page 5, Lines 28-29. Accordingly, the Office Action was incorrect in stating that the *Lee et al.* teaches a magnesium oxide protective layer. It actually teaches a magnesium fluoride anti-reflection coating which will be generally one of many layers to form an approximate quarter wavelength design, as known in the optical field. This is consistent with the desires set forth in the PCT/WO Publication, Page 2, Lines 28-29, to provide a thin film formation for low scatter, low loss, dense films.

The PCT WO Publication disclosed an electron beam directed at a source material to evaporate material to be coated. The electron beam, however, was not utilized to provide momentum to the coating material as it was applied to the substrate. The purported invention disclosed in the PCT/WO reference can be found in the Description of the Summary of the Invention, on Page 4, Lines 13-19, as follows:

> Coating material is evaporated with the electron beam gun and forms a coating material evaporant that is directed towards the substrate positioned on the substrate carrier. The ion gun is directed toward the substrate and produces ions that arrive substantially with the coating material evaporant at the substrate surface. The ions provide a momentum assist to the coating material. A dielectric thin film coating is then formed on the substrate.

Thus, this reference teaches an ion gun directed towards the substrate so that the ions will arrive substantially simultaneously with the coating material evaporant, and the ions will provide

a momentum assist to the coating material. The Office Action cited Page 5 for the premise that the electron beam gun can be used to grow magnesium oxide thin film, but Page 5 of the PCT/WO Publication does not mention magnesium oxide, and only states that the electron beam provides an evaporant flux. However, Page 5 does discuss at Lines 5-8, the following:

> The ion/coating material evaporant arrival ratio at the substrate is controlled to create a desired density of coating material dielectric thin film layers. Further, the ions are utilized in order to increase the energy of the coating material deposited as layers on the substrate.

Thus, there is a desire to create as high as possible energy to the coating material by transferring the momentum of the ions to the depositing material. This is further explained on Page 6, Lines 1-6, as follows:

> This energy is transferred or imparted to the coating molecules via a collisional process with energetic oxygen ions, of specified energy and flux, at the substrate level where the dielectric thin film microstructures take form. In this method, a key parameter is the ion/evaporant molecule arrival ratio which determines the density of the growing film.
>
> [Underline added.]

Referring to Figure 7 of our present application, and Column 10, lines 42-47, an electron gun 42 is also used to develop an evaporant material. However, another electron gun 44 is directed at the substrate and is used to assist in the depositing of an improved, dense alkaline earth oxide with a (110)-face orientation with the electron beams impacting the surface of the dielectric layer to further evaporate the dielectric layer as it is deposited on the glass substrate, see specific examples 19, 20, 30 and 31 and Column 11, lines 1-5. Thus, the heat created through impact with the electron beam provides the desired (110)-face crystal growth with the density desired in the environment of a plasma display panel.

The present invention with a (110)-crystal face orientation created by this unique application of an electron beam to the substrate provides a very dense formation of a protective layer to improve against sputtering deterioration that can occur during the life expectancy operation of a plasma display panel. Additionally, our invention permits reducing a driving voltage of the plasma display panel and improves the panel brightness because of its large emission coefficient of secondary electrons.

The conventional (111)-face orientation further may react with water content in the air to form hydroxides and has a lower heat resistance for a resulting magnesium oxide protective layer with a (111)-face orientation.

The resulting products produced by our apparatus can have a significantly higher heat resistant and thereby can enable heat treatment to be performed in the fabrication of the plasma display panels at higher elevated temperatures of about 450°C. Thus, an aging process time to remove contaminants, which is important in extending the life of a plasma display panel, can be considerably shortened.

Applicants accordingly request reconsideration since the apparatus for applying an electron beam to the substrate surface during the coating procedure is significantly different than the ion beam procedures taught in the *Lee et al.* PCT/WO Publication. This can be appreciated when the difference in the physical property of mass between an electron and an ion is taken into consideration.

For example, the lightest element of hydrogen has a mass of 1.66×10^{-27} (Kg). Compare this mass, however, with an electron mass of only 9.11×10^{-31} (Kg).

As can be appreciated, a hydrogen atom is not taught or suggested in the *Lee et al.* disclosure. Rather, the ion beams from the ion gun are composed of considerably heavier ions of

oxygen or argon, which are much larger than hydrogen in mass. Comparing, however, the hydrogen atom with the electron, the hydrogen atom is 1822 times the mass of the electron.

When ion beams are emitted onto an alkaline earth oxide, the heavier ions will collide with significantly higher mass and kinetic energy, and may have a tendency to destroy the crystal structure or to cause defects due to the energy transformed by the mass of such an accelerated ion. This can create a sputtering effect as is well-known in forming semiconductor thin films.

Our unique use of an electron beam takes advantage of a much smaller mass so that as a result, when the electrons are emitted and collide with an alkaline earth oxide, a far less impact or transfer of energy will occur and will not disrupt the growth nor destroy the crystals, thereby permitting the forming of a much more uniform and dense film with a 110-face crystal growth.

The Office Action contended that the limitations of a 110-face orientation were not given weight since it was asserted that it would be obvious to a person of ordinary skill in this field through simply routine experimentation to provide an operable crystal face orientation by using the *Lee et al.* disclosure. The *Lee et al.* disclosure, however, is deficient in teaching (1) a magnesium oxide dielectric layer, (2) the use of an electron beam for momentum transfer to the alkaline earth oxide, and (3) the creation of a 110-face crystal structure.

The *Lee et al.* reference is not directed to solving a problem in a plasma display panel by providing an adequate protective layer with a particular crystal orientation. It does not utilize nor teach an apparatus with an electron beam gun to be applied to the surface to assist in the formation of the particular crystal orientation. *Lee et al.* simply teaches a conventional electron beam for evaporation purposes only. The present invention, as set forth in the claims, does not utilize the asserted key parameter teaching of the *Lee et al.* reference, namely the ion/evaporant molecular arrival ratio to determine any density of a growing film.

It is respectfully submitted that it would not be obvious to create the apparatus of the present invention in view of the teachings of the *Lee et al.* reference.

It is believed that the case is now in condition for allowance, and an early notification of the same is requested.

I hereby certify that this correspondence is being transmitted via fax to 703-872-9306, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on April 26, 2005.

By: Sharon Farnus

Signature

Dated: April 26, 2005

Very truly yours,

SNELL & WILMER L.L.P.

Joseph W. Price
Registration No. 25,124
1920 Main Street, Suite 1200
Irvine, California 92614-7230
Telephone: (949) 253-4920

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Approved for use through 04/30/2007. OMB 0651-0033
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

REISSUE APPLICATION DECLARATION BY THE ASSIGNEE

Docket Number (optional): 72478-3417

I hereby declare that:

The residence, mailing address and citizenship of the inventors are stated below.

I am authorized to act on behalf of the following assignee: Matsushita Electric Industrial Co., Ltd.

and the title of my position with said assignee is: Director, IP Development Center

and the title of my position with said assignee is: _____

The entire title to the patent identified below is vested in said assignee.

Inventor	Citizenship
Masaki Aoki	Japan
Residence/Mailing Address: 1006, Oaza Kadoma, Kadoma-shi, Osaka-fu, Japan	
Inventor	Citizenship
Hideo Torii	Japan
Residence/Mailing Address: 1006, Oaza Kadoma, Kadoma-shi, Osaka-fu, Japan	

☒ Additional Inventors are named on separately numbered sheets attached hereto.

Patent	Date of Patent Issued
5,993,543	November 30, 1999

Title of Invention: METHOD OF PRODUCING PLASMA DISPLAY PANEL WITH PROTECTIVE LAYER OF AN ALKALINE EARTH OXIDE

I believe said inventor(s) to be the original and first inventor(s) of the subject matter which is described and claimed in said patent, for which a reissue patent is sought on the invention entitled: METHOD OF PRODUCING PLASMA DISPLAY PANEL WITH PROTECTIVE LAYER OF AN ALKALINE EARTH OXIDE

the specification of which

☐ is attached hereto.

☒ was filed on November 29, 2001 as reissue application number 09/997,536

and was amended on October 4, 2004 (If applicable)

I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.

☐ I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b). Attached is form PTO/SB/2B (or equivalent) listing the foreign applications.

I verily believe the original patent to be wholly or partly inoperative or invalid, for the reasons described below. (Check all boxes that apply.)

☐ by reason of a defective specification or drawing.

☒ by reason of the patentee claiming more or less than he had the right to claim in the patent.

☐ by reason of other errors.

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REISSUE APPLICATION DECLARATION BY THE ASSIGNEE	Docket Number (Optional) 72478-3417

At least one error upon which reissue is based is described as follows:

The original claims in U.S. Patent 5,993,543 are only method claims and failed to provide claims on the apparatus and system disclosed in the specification and drawings.

[Attach additional sheets, if needed.]

All errors corrected in this reissue application arose without any deceptive intention on the part of the applicant.

I hereby appoint:

☒ Practitioners at Customer number: 21611

OR

☐ Practitioner(s) named below:

Name	Registration Number

Correspondence Address: Direct all communications about the application to:

☒ Customer Number: 21611

OR

☐ Firm or Individual Name					
Address					
Address		State		Zip	
City					
Country		Fax			
Telephone					

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine and imprisonment, or both, under 18 U.S.C. 1001, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this declaration is directed.

Full name of person signing (given name, family name) Isamu Shimura
Director, IP Development Center
~~Authorized Signing Officer~~

Signature Isamu Shimura Date 01 Feb, 2005

Address of Assignee
1006, Oaza Kadoma, Kadoma-shi, Osaka-fu, Japan

Attorney Docket: 72478-3417
Serial No. 09/997,536

REISSUE APPLICATION DECLARATION BY THE ASSIGNEE

Additional Inventors and addresses:

Eiji Fujii Citizenship: Japan
Address: 1006, Oaza Kadoma, Kadoma-shi, Osaka-fu, Japan

Mitsuhiro Ohtani Citizenship: Japan
Address: 1006, Oaza Kadoma, Kadoma-shi, Osaka-fu, Japan

Takashi Inami Citizenship: Japan
Address: 1006, Oaza Kadoma, Kadoma-shi, Osaka-fu, Japan

Hiroyuki Kawamura Citizenship: Japan
Address: 1006, Oaza Kadoma, Kadoma-shi, Osaka-fu, Japan

Hiroyoshi Tanaka Citizenship: Japan
Address: 1006, Oaza Kadoma, Kadoma-shi, Osaka-fu, Japan

Ryuichi Murai Citizenship: Japan
Address: 1006, Oaza Kadoma, Kadoma-shi, Osaka-fu, Japan

Yasuhisa Ishikura Citizenship: Japan
Address: 1006, Oaza Kadoma, Kadoma-shi, Osaka-fu, Japan

Yutaka Nishimura Citizenship: Japan
Address: 1006, Oaza Kadoma, Kadoma-shi, Osaka-fu, Japan

Katsuyoshi Yamashita Citizenship: Japan
Address: 1006, Oaza Kadoma, Kadoma-shi, Osaka-fu, Japan